

## High-Risk Obstetrics & Neonatal Care Best Outcomes for At-Risk Mothers & Babies



Over half of our more than 7,000 deliveries each year are designated as high-risk or increased risk



# NewYork-Presbyterian

## Leaders in High-Risk Obstetrics, Fetal Care & Newborn Management

NewYork-Presbyterian/Columbia University Medical Center is one of the nation's most comprehensive and technologically advanced academic medical centers, with leading specialists in both adult and pediatric care.



One of a handful of regional referral centers for pregnancies that may be at risk for a premature or complicated delivery requiring rigorous prenatal management, we are widely recognized for our optimum patient outcomes. Our physicians and surgeons from all specialties have a long history of collaborating on a high volume of complex cases.

NewYork-Presbyterian/Columbia University Medical Center includes Sloane Hospital for Women, The Allen Hospital and Morgan Stanley Children's Hospital. According to the 2017-18 *U.S. News & World Report* "Best Children's Hospitals" rankings, Morgan Stanley Children's Hospital ranks in more pediatric specialties than any other hospital in the metropolitan New York City area, with distinct leadership in neonatology and congenital and pediatric cardiac surgery. The state of New York has designated NewYork-Presbyterian Morgan Stanley Children's Hospital as a Regional Perinatal Center, the highest hospital classification for obstetrics and neonatal care, affirming that we have the expertise, subspecialties, and services to care for the most challenging and highest risk medically complex mothers and babies. We work closely with referring physicians to manage a wide variety of problems that can arise during pregnancy.

Our affiliation with Vagelos College of Physicians and Surgeons, one of the nation's preeminent medical schools, allows us to attract top physicians and researchers, keeping us at the leading edge of new developments in high-risk pregnancy management and treatments. We have built a reputation as a leading center for pediatric care, medical education, and scientific research.

# Sloane Hospital for Women

## A Specialized Hospital for Expectant Mothers

### Fast Facts

Over **4,500** annual deliveries

Over **20** Maternal-Fetal Medicine specialists

**80%** epidural rate

**37%** cesarean delivery rate (2016)

**53.8** multiple gestations per 1,000 deliveries

Average length of stay **3.2** days

Over **1,000** NICU discharges

Nearly **175** NICU transfers



Sloane Hospital for Women, part of NewYork-Presbyterian/Columbia University Medical Center has been caring for women for more than a century and offers specialized services for high-risk pregnancy available in just a few programs in the United States.

We provide individualized care and rigorous prenatal management for expectant mothers who are referred to us with an obstetric complication or a high-risk health condition, as well as for those whose pregnancy is complicated by a multiple gestation or a fetal structural, functional or genetic abnormality.

With Labor and Delivery an integral part of NewYork-Presbyterian Morgan Stanley Children's Hospital, we are able to offer every possible diagnostic and therapeutic option for both mothers and babies. We are one of only a few hospitals nationally that has labor and delivery in the same building as our children's hospital. As a result, mother and baby never need to be separated.

Our 75-bed Level 4 Neonatal Intensive Care Unit (NICU) is recognized as one of the finest in the country, with the depth of expertise, advanced technology and therapies available to offer the best chance for survival. Our team of physicians, specially trained in intensive care, has pioneered many therapies for newborn babies now used worldwide.

In a family-friendly and technologically-advanced setting, NewYork-Presbyterian Morgan Stanley Children's Hospital offers the best available care in every area of pediatrics – including the most complex neonatal and critical care, and all areas of pediatric subspecialties.



## Collaborative Interdisciplinary Care for Pregnancy

Bringing together diverse expertise from every field of medicine and surgery, we develop treatment programs and therapeutic options to ensure the best possible outcomes for high-risk mothers and babies.

We believe the best outcomes are a result of multidisciplinary collaborative care, where there is active communication among specialists. A team of more than 30 specialists experienced in obstetrical, maternal-fetal, pediatric, and neonatal conditions focuses on all the medical and surgical complications of pregnancy. From obstetrical anesthesiologists, cardiologists, and gynecological oncologists to interventional radiology, neonatologists, pediatric cardiac surgeons, an on-site blood bank, and a mobile ECMO (Extracorporeal Membrane Oxygenation), the team can be mobilized in minutes. They are supported by clinical nurses and genetic counselors, all trained in the management of high-risk pregnancies.

# The Mothers Center

Our innovative Mothers Center is **dedicated to improving care and outcomes** for the sickest, most medically complicated pregnant women.



The Mothers Center centralizes services to give pregnant women with medical conditions that may cause complications during pregnancy and beyond, a single point of access to all our specialists — before and during pregnancy, as well as in the postpartum period. This center of excellence serves as a national model for the care of medically and surgically complex obstetrical patients.

Since 2013, The Mothers Center has cared for over 850 expectant mothers faced with challenging medical and surgical problems during pregnancy. These patients have come to us for consultation, decision-making and therapy from within our institution, as well as from across the city of New York. Our team of obstetricians, surgeons, cardiologists, neurologists and anesthesiologists meets weekly to discuss our patients and develop ongoing care plans to ensure the safest outcome for mothers and their babies.

Our multidisciplinary team is prepared to care for women with a wide variety of conditions and most frequently sees patients for abnormal placentation, cardiac conditions, and neurologic disorders. We are firmly committed to bringing The Mothers Center to the forefront of pregnancy care in New York. Our goal is to make pregnancy safe for every mother and child. We believe that this will be achieved through regionalization of complex care and a strong multidisciplinary team approach.

## Accreta Program

NewYork-Presbyterian is well-known as a referral center for placenta accreta, a complication in which the placenta attaches itself too deeply into the wall of the uterus. Approximately one in 2,500 pregnancies experience placenta accreta nationally.

Women with this condition are at risk for premature birth and life-threatening postpartum blood loss. Our multidisciplinary team has the technology, expertise and resources to diagnose this condition early in pregnancy, and coordinate a delivery plan that maximizes the safety of both mother and child, relying on the expertise of our surgical personnel and blood bank resources to deal with any complications. Since 2013, 156 suspected abnormal placentation cases were referred to The Mothers Center for consultation. Of those, 75 (48.7%) accreta cases were diagnosed and successfully managed for placenta accreta and other types of abnormal placentation.

### Women's Cardiac Program

Maternal cardiac disease is the most frequent medical disorder prompting referral to The Mothers Center. Our Maternal-Fetal Medicine team works closely with a team of experienced cardiologists and cardiothoracic surgeons to care for patients with congenital heart disease, valvular heart lesions, and pulmonary hypertension and heart failure. Patients with these conditions are seen and evaluated by cardiologists with specific expertise in managing these issues through pregnancy. Each patient's ongoing care and delivery plan are created and reviewed by a multidisciplinary team which includes obstetric anesthesiology and critical care nursing, in addition to Maternal-Fetal Medicine and medical subspecialty teams.

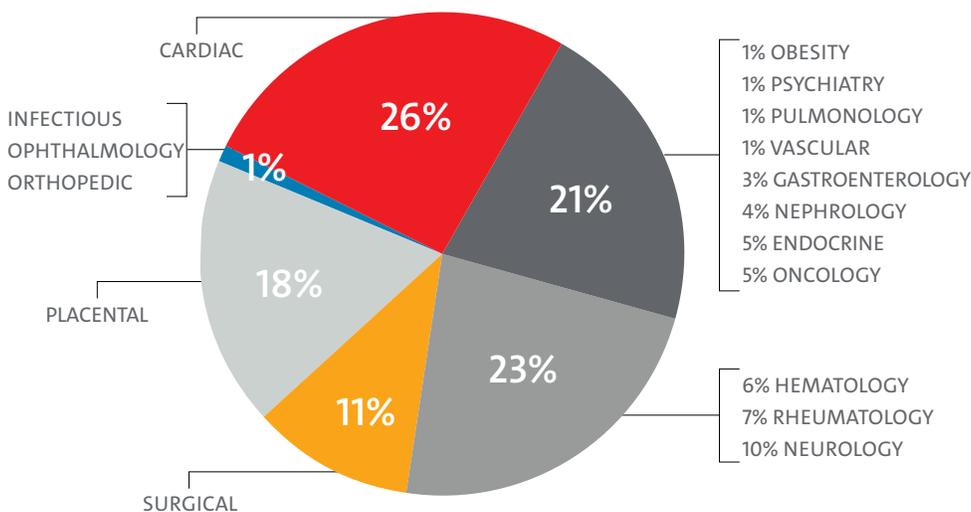
### Surgical Program

The new Mothers Center surgical program integrating gynecologic surgery and obstetrics has enjoyed considerable growth since its mid-2014 inception. Since 2013, 65 referrals for incompetent cervix procedures have resulted in 48 qualifying cases for transabdominal cerclage, a procedure to prevent miscarriage or premature labor.

### Women With Epilepsy

The Mothers Center is a center of excellence for managing maternal seizure disorders. Maternal-Fetal Medicine specialists work closely with neurologists whose clinical and research expertise in the field of epilepsy are unmatched. Together, the team develops an ongoing care and delivery plan focused on ensuring maternal safety while minimizing fetal risk. The team also counsels patients about treatment exposures and long-term outcome, while facilitating postpartum care and therapy.

### The Mothers Center Primary Diagnoses 2013 - 2016



### What We Treat

- Cardiovascular Disease
- Endocrine Disease
- Gastrointestinal Disease
- Hematologic Disease
- Infectious Disease
- Neurologic Disease
- Oncologic Disease
- Ophthalmologic Disease
- Orthopedic Disease
- Placental Disease
- Psychiatric Disease
- Pulmonary Disease
- Renal Disease
- Rheumatologic Disease
- Surgical
- Vascular Disease

# The Center for Prenatal Pediatrics

## Advanced Interventional Diagnostic & Monitoring Capabilities

- Chorionic villus sampling (CVS)
- Amniocentesis
- Multifetal and selective reduction
- Percutaneous umbilical blood sampling (PUBS)
- Fetal blood transfusion
- Fetal biopsy
- Diagnostic fetoscopy
- Placental biopsy – when fetal blood and amniotic fluid are unobtainable
- Radiofrequency ablation
- Fetoscopic laser photocoagulation

For patients whose pregnancies are affected by significant fetal complications, we coordinate care with our Maternal-Fetal Medicine (MFM) specialists at our Carmen and John Thain Center for Prenatal Pediatrics.

Our comprehensive prenatal program offers expectant mothers and their babies one of the nation's largest, most experienced teams of physicians specialized in detecting, diagnosing and treating complex conditions. Our patients have access to virtually any maternal-fetal, obstetric or pediatric subspecialty that may be required. Each year, 500-600 patients and their families are cared for at the Carmen and John Thain Center for Prenatal Pediatrics.

The Center for Prenatal Pediatrics brings together teams of multidisciplinary experts to diagnose, manage and treat pregnancies complicated by multiple births and fetal, genetic, or developmental abnormalities. We have more than 20 Maternal-Fetal Medicine specialists who consult with pediatric neonatal experts to develop care plans to optimize a baby's health outcome. Our nurses have specialized training and experience in high-risk obstetrical care, with expertise and certification in fetal monitoring and resuscitation.

Close collaboration among our specialists ensures that both mother and baby have access to any subspecialty and diagnostic or treatment option needed. Each patient's unique situation is presented to prenatal and pediatric practitioners across all specialties. Results from diagnostic tests, consultations and opinions are shared, providing a systematic, collaborative and consensus approach.



Dr. Lynn L. Simpson, Chief of Maternal-Fetal Medicine

## Prenatal Imaging

We offer specialized expertise in fetal MRI, sophisticated 3-D and 4-D ultrasound imaging, and fetal echocardiography. Our sonographers and fetal medicine physicians are experts in evaluating fetal development and identifying structural defects.

## Early, Accurate Prenatal Diagnosis

Outcomes are better when diagnosed and treated early. The Center for Prenatal Pediatrics is at the forefront of early, first trimester screening in pregnancy and advanced prenatal diagnostic testing for fetal chromosome abnormalities and birth defects.

Some of the disorders we can diagnose and treat prenatally include:

- Cardiac arrhythmias
- Major heart conditions (treated immediately after birth)
- Twin-Twin Transfusion Syndrome (TTTS)
- Fetal anemia
- Fetal urinary tract obstructions
- Bladder obstruction
- Neural tube defect
- Inborn errors of metabolism
- Rare genetic diseases

## Chorionic Villus Sampling (CVS)

Chorionic villus sampling is a first trimester diagnostic tool used for early prenatal diagnosis. We have performed some 643 CVS procedures, more than any other center in the region. CVS is used to detect genetic disorders such as Tay-Sachs disease, sickle cell anemia, cystic fibrosis, thalassemia and Down syndrome.

## Percutaneous Umbilical Blood Sampling (PUBS)

Fetal blood sampling via PUBS, sometimes called cordocentesis, is a very complex procedure performed by specially trained perinatologists as part of diagnosing, treating, and monitoring fetal problems at various times during pregnancy, when other tests or procedures are not possible or not effective.

The Center for Prenatal Pediatrics is at the forefront of early, first trimester screening in pregnancy.



# Multiple Gestation Monitoring & Specialized Care

Women carrying multiples are at significantly increased risk for preterm labor and delivery.

Between 1980 and 2009, the number of twin pregnancies in the United States rose by 76 percent. Pregnancies with multiple fetuses require heightened prenatal monitoring and specialized clinical management. Maternal-Fetal Medicine subspecialists have expertise in providing this specialized care, from managing identical twin gestations complicated by malformations, to evaluation and treatment of discordant growth and twin-twin transfusion syndrome.

Given the increased risk of congenital anomalies in twin gestations, our Maternal-Fetal Medicine specialists recommend a detailed sonographic survey of fetal anatomy in the early second trimester of twin gestations. In monochorionic twin gestations and dichorionic twin pregnancies conceived using assisted reproductive technologies, our specialists suggest fetal echocardiography because the risk of congenital heart disease is increased in these populations.

## In Utero Diagnostic Procedures

Our Maternal-Fetal Medicine specialists have pioneered in utero fetal procedures to diagnose and treat some of these serious complications using chorionic villus sampling, radiofrequency ablation, fetal blood sampling and transfusion, and drainage and shunt procedures.

## Non-Selective Reduction & Selective Termination

To improve pregnancy outcome, we offer non-selective multifetal reduction when assisted reproduction techniques result in multifetal pregnancy, and selective termination when the well-being of a healthy fetus is threatened by an anomalous fetus.



## Abnormalities We Can Diagnose & Treat

We have particular expertise in diagnosing and treating a range of problems affecting pregnancies with multiples including:

- Preterm labor
- Intrauterine growth restriction
- Birth defects and genetic syndromes
- Monoamniotic twins
- Twin-Twin Transfusion Syndrome (TTTS)
- High-order multiples
- Twin Reversed Arterial Perfusion (TRAP) – also known as acardiac twin

### Twin-Twin Transfusion Syndrome/Laser Photocoagulation

As the number of women having twins has increased, so have the chances of developing a serious pregnancy complication called Twin-Twin Transfusion Syndrome (TTTS). This disorder affects as many as 15 percent of identical twin pregnancies and results from uneven blood flow between the fetuses. Successful treatment of this complex condition requires advanced training and experience available at only a few specialized perinatal centers in the United States. In more than 70 percent of cases, both twins will die if this syndrome is not treated early in pregnancy.

Over last three years, our Maternal-Fetal Medicine specialists performed more than 76 laser photocoagulation procedures, a minimally invasive laser treatment which involves coagulating unnecessary and harmful blood connections between the two fetuses. Typically, our doctors perform this procedure between 16 and 26 weeks of gestation to help improve survival and neurological outcomes for identical twins with this syndrome.

Recent hospital data show that in 80-90 percent of cases using the photocoagulation procedure, one twin will survive. Both twins will survive in over 50 percent of cases, and fewer than 10-20 percent of surviving twins will have brain damage. The traditional approach of amnioreduction had a lower survival rate and more neurologically impaired survivors. NewYork-Presbyterian Morgan Stanley Children's Hospital is currently the only center in Manhattan that performs the laser photocoagulation procedure.

NewYork-Presbyterian Morgan Stanley Children's Hospital is currently **the only center in Manhattan that performs the laser photocoagulation procedure for Twin-Twin Transfusion Syndrome (TTTS).**



Dr. Russell Miller, Medical Director, Carmen and John Thain Center for Prenatal Pediatrics

# Neonatal Intensive Care

Complex birth defects are a key focus of our fetal and newborn medical teams.

NewYork-Presbyterian Morgan Stanley Children's Hospital Neonatal Intensive Care Unit (NICU) is designated Level 4 and a New York State Regional Perinatal Center. We care for over 1,100 critically ill infants every year, with approximately 30 percent of those transferred to us after delivery at other centers, some of them the most complex cases from other Level 4 centers.

We provide the highest level of neonatal care and have a full range of medical and surgical subspecialties to care for the sickest infants, including those with extreme prematurity, respiratory failure, very low birth weight/extremely low birth weight, congenital heart disease, and other complex congenital abnormalities that may require surgery.

Our multidisciplinary Comfort Care Team of obstetricians and neonatologists, delivery room, post-partum and NICU nurses, social workers, and other specialists provide an individualized and compassionate plan of postnatal care to infants with life-limiting conditions.

## Very Low Birth Weight (VLBW) Infants

In 2016, our neonatologists treated over 165 very low birth weight (<1,500 grams) newborns and our NICU outperformed the Vermont Oxford Network (VON)\* benchmarks in several significant categories. Notably, NewYork-Presbyterian Morgan Stanley Children's Hospital has one of the best infant survival rates among neonatal intensive care units nationally, with both inborn and admitted VLBW infants having a significantly higher survival rate than those in the Vermont Oxford Network benchmark\*. Additionally, our outcomes for neonates with chronic lung disease are excellent, a result of our expertise in Continuous Positive Airway Pressure (CPAP).

## Comparison to Vermont Oxford Network (VON)\* benchmark demonstrates excellent outcomes for inborn Very Low Birth Weight (VLBW) infants during 2016.

\* Our NICU is part of the Vermont Oxford Network (VON), a consortium of over 800 participating NICUs around the world, which provides a benchmark for quality patient care. Infants are eligible for the Very Low Birth Weight (VLBW) database if they have a birth weight from 401 to 1500 g, or a gestational age between 22 and 32 weeks and are born at the member hospital or transferred to it within 28 days of birth.

	NYP MSCH NICU	VON NICU Type C**
Mortality	13.1%	16.3%
Death or Morbidity	33.9%	47.6%
Chronic Lung Disease	7.6%	27.7%
Any Intraventricular Hemorrhage	11.2%	25.0%
Severe Intraventricular Hemorrhage	6.6%	9.7%
Late Bacterial Infection	6.0%	9.2%
Any Late Infection	8.7%	13.6%

\*\* VON NICUs with no restriction on ventilation and major surgery performed, including cardiac surgery.

# Advanced Support Technology

**Complex birth defects are a key focus of our fetal and newborn medical teams. Among the advanced procedures we offer are:**

**CPAP** Continuous Positive Airway Pressure is a technology we deploy to manage respiratory complications to assist infants who cannot maintain adequate oxygen levels. NewYork-Presbyterian Morgan Stanley Children's Hospital and NewYork-Presbyterian/Columbia University Medical Center are known worldwide for the development of this gentle ventilatory support pioneered by our doctors in the 1970s.

Bronchopulmonary dysplasia (BPD) remains a major source of morbidity and mortality for extremely low birth weight infants. The frequency of chronic lung disease in premature infants treated in our unit is the lowest in the United States, and we have been recognized by the National Institutes of Health for our contribution to respiratory care of preterm babies.

**ECMO** Extracorporeal Membrane Oxygenation is an artificial heart and lung that supports oxygenation until a baby's heart defect can be corrected or failing lungs can function on their own. Columbia physicians at NewYork-Presbyterian Morgan Stanley Children's Hospital (formerly Babies Hospital) participated in the earliest development of ECMO, making our facility one of the first in the world to use this life-saving technology successfully in infants with severe reversible cardiorespiratory failure unresponsive to conventional therapies. Today, we have the largest ECMO program in the New York Metro area. Approximately 20 of our newborns require this specialized technology each year.

Our neonatal team delivers some of the best survival rates in national and international comparisons. Both our pediatric and adult ECMO programs have earned platinum level Center of Excellence status from the Extracorporeal Life Support Organization (ELSO), a consortium of healthcare professionals and scientists dedicated to the development and evaluation of novel therapies for the support of failing organ systems. Our pediatric program is one of only four worldwide to be awarded this status.



**EXIT** Extra Uterine Intrapartum Treatment is a life-saving surgical procedure used to deliver babies with congenital airway compression or obstruction. NewYork-Presbyterian Morgan Stanley Children's Hospital is one of a handful of centers with the depth of expertise to perform this procedure. An EXIT is a joint procedure involving multiple specialties, including Maternal-Fetal Medicine, Neonatology, Pediatric Surgery and Otolaryngology. NewYork-Presbyterian Morgan Stanley Children's Hospital typically performs two to three EXIT procedures each year. When carefully planned, EXIT procedures should have minimal maternal morbidity and generally result in good neonatal outcomes, but should be performed at a hospital with both adult and pediatric specialists who can care for both mother and child at delivery and after birth.

**BRAIN COOLING** Our neonatal specialists use the CoolCap device to prevent brain injury and improve neurologic outcomes in some oxygen-deprived newborn babies. In early clinical trials performed at our hospital, birth related neurodevelopmental disability was significantly reduced from 66 percent to 48 percent by the cooling and there was a trend to a reduction in mortality in cooled infants.

NewYork-Presbyterian Morgan Stanley Children's Hospital has one of the **best infant survival rates** among neonatal intensive care units in the nation.



Dr. Richard Polin and Dr. Ganga Krishnamurthy



## Neonatal Cardiac Care

NewYork-Presbyterian is the region's largest pediatric and adult congenital heart referral center.

NewYork-Presbyterian's team of four pediatric cardiac surgeons, led by Dr. Emile Bacha, performs approximately 175 newborn heart repairs each year, making NewYork-Presbyterian the largest congenital heart defect referral center in the region. Our surgeons routinely treat some of the most complex cases, many turned away by other institutions, yet we have the lowest mortality rate in New York State for pediatric heart surgery, and one of the lowest in the country.

According to a New York State report released in 2016, from 2010-2013 (the most recent period for which data are available), NewYork-Presbyterian Morgan Stanley Children's Hospital surgeons performed 1,558 pediatric congenital cardiac surgeries, the highest number of cases in New York State. Our risk-adjusted mortality rate for the period is 2.26 – significantly lower than the New York State expected mortality rate of 3.85. The report compiles outcomes for pediatric patients (less than 18 years old) who have surgery to correct congenital heart defects. New York is the only state in the country known to evaluate and release this kind of information for pediatric cardiac surgery.

## Complexity-Adjusted Performance Measurement

To compare performance of congenital heart surgery centers, the Society of Thoracic Surgeons (STS) has assigned difficulty scores for each surgical procedure based on potential for mortality, potential for morbidity, and surgical difficulty. The procedures are scored from 1 to 5, with 5 being the most difficult. Mortality is tracked for each level. The STS Congenital Heart Surgery Database provides the most accurate information to help assess outcomes of pediatric heart surgery programs.

## Performance Excellence

Cumulative survival for approximately 500 neonates at NewYork-Presbyterian Morgan Stanley Children's Hospital requiring heart surgery 2013-2016 was more than 92 percent — and better than the STS benchmark mortality in most difficulty categories.

We have the lowest mortality rate in New York State for pediatric heart surgery, and one of the lowest in the nation.

### Neonatal Mortality and STS Benchmark 2013-2016

Difficulty Category	NewYork-Presbyterian Morgan Stanley Children's Hospital Mortality	STS Benchmark Mortality
Difficulty 1	0%	1.7%
Difficulty 2	5.7%	3.4%
Difficulty 3	3.1%	3.2%
Difficulty 4	8.5%	8.8%
Difficulty 5	11.9%	17.0 %
Overall	7.4%	8.6 %

least complex



most complex

*Overall mortality for the NewYork-Presbyterian Congenital Heart Center is lower than the benchmark, despite increasing case mix index (increasing complexity and severity of illness) at our cardiac NICU from 9.85 in 2013 to 11.7 in 2017.*

# Neonatal Cardiac Care

A dedicated Infant Cardiac ICU differentiates the care we provide.

## Dedicated Infant Cardiac Intensive Care Unit (ICICU)

Many neonates require heart surgery within hours of birth. Because these babies differ from infants and older children not just in size, but also in the physiology of their maturing organs and systems, we believe they require unique and differentiated care. The Vivian and Seymour Milstein Family Infant Cardiac Intensive Care Unit, a state-of-the-art unit dedicated solely to infant cardiac care (0-3 months), is the first-of-its-kind facility in the United States.

Primarily premature or low birth weight newborns, these patients not only need expert surgeons able to operate on such tiny patients, but also require specialized life support technology, tiny tools, and a multidisciplinary team prepared to handle these intricate and complex challenges. From beds to medical and surgical equipment, all resources are designed for the smallest of patients. This includes specialized machines and assist devices that replace the function of the heart and lungs, such as the Berlin Heart and the ECMO (extracorporeal membrane oxygenation) machine, and 3-D printing to help guide surgery. We are also one of the few institutions in the world offering continuous renal replacement therapies such as continuous veno-venous hemofiltration (CVVH) and neurologic monitoring to the smallest patients.

This specialized unit is staffed by a highly skilled team of neonatal and pediatric cardiac intensivists, pediatric cardiologists, neonatal cardiac nurses, neonatal and pediatric cardiac nurse practitioners and other ancillary medical providers.

We believe this highly specialized care model provides the best outcomes for newborn infants with congenital heart disease.



Dr. Richard A. Polin, Director, Neonatology, NewYork-Presbyterian Morgan Stanley Children's Hospital

### Neonatal Mortality Rates in the United States

Though neonates comprise approximately 25 percent of the congenital heart surgeries in the United States, the mortality rate is approximately 9 percent – three times higher than infants, the next largest surgical category.

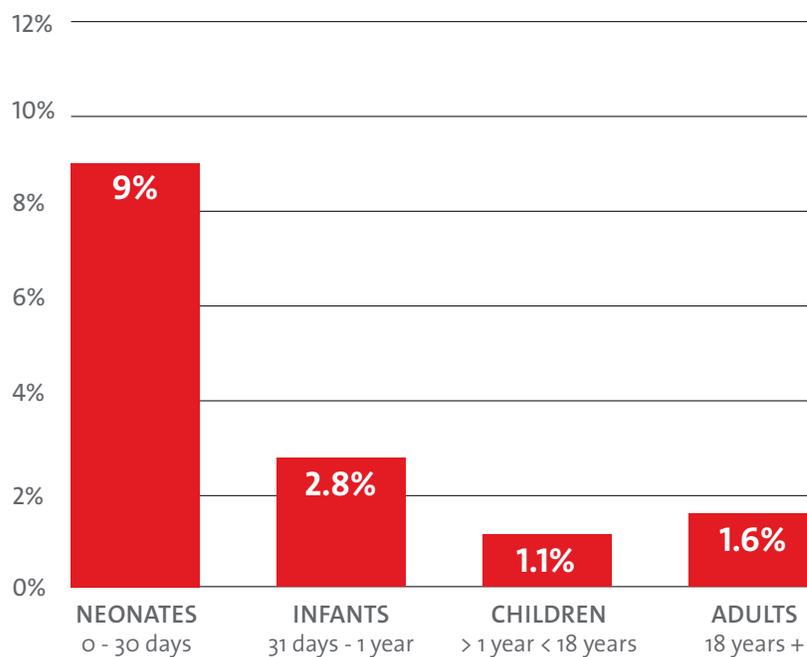
Increased neonatal mortality has several causes: birth before 39 weeks' gestation, immature organ systems, and technical issues related to structure, insertion of tubes, cardiopulmonary bypass, and limited reserve.

By focusing exclusively on neonates, rather than the whole age spectrum, we feel we have developed unsurpassed expertise in the care of newborns with heart disease, particularly those who are premature and of low birth weight and those born with multiple anomalies.

By focusing exclusively on neonates with cardiac disease, we feel we have developed unsurpassed expertise in the care of low birth weight and premature babies.

Neonates comprise approximately 25 percent of the congenital heart surgeries in the United States. The mortality rate is approximately 9 percent – three times higher than infants.

**Congenital Heart Surgery Mortality in the United States  
2012-2015**



Source: Society of Thoracic Surgeons

# Breakthrough Innovations & Interventions

As one of the nation's leading academic medical centers, NewYork-Presbyterian/Columbia University Medical Center has one of the largest clinical research programs in the country. Our patients have access to still-emerging innovative interventions performed in few hospitals, as well as national studies that improve survival and neurological outcomes for babies.

Our physicians and scientists continue to make groundbreaking contributions to newborn care with procedures and therapies for a range of challenging diseases and disorders.



Thanks to this 3-D heart model, cardiac surgeons at NewYork-Presbyterian Congenital Heart Center could plan an infant's operation before stepping into the OR.

## Notable Achievements Include...

- **Columbia physician Virginia Apgar developed the now ubiquitous APGAR score in 1952**, a simple rapid method for assessing newborn vitality immediately after birth to determine if any medical intervention is required. This method reduced infant mortality and laid the foundation for modern-day neonatology. The APGAR score is still considered the best predictor of infant health in the first month of life and is used throughout the world.
- In 1984, we performed the **first successful pediatric heart transplant** in the United States.
- We were the **first hospital to introduce amniocentesis** and pioneer its use in detecting birth defects.
- We founded **New York City's first in vitro fertilization program**.
- NewYork-Presbyterian Morgan Stanley Children's Hospital pioneered the use of **Bubble CPAP or Continuous Positive Airway Pressure** for newborns with respiratory distress syndrome. With Bubble CPAP therapy, pressurized oxygen is delivered through the baby's nose, allowing continuous lung inflation. Babies breathe with assistance as opposed to a machine breathing for them. This low-tech therapy is performed minutes following birth to prevent chronic lung disease. The neonatal intensive care unit at NewYork-Presbyterian Morgan Stanley Children's Hospital is a recognized leader in this gentle, noninvasive technique and has one of the lowest chronic lung disease incidence rates in the world.
- In 2014, a team of surgeons at NewYork-Presbyterian Morgan Stanley Children's Hospital **saved the life of a two-week-old newborn using a 3-D printed model of the child's heart** as a guide for surgery on the child, who was born with complex heart defects, including many holes and malformations. With the aid of the 3-D model, the team was able to repair all of the heart's defects in a single procedure. Typically, babies born with this complex form of congenital heart disease require a series of three or four life-threatening surgeries.
- In 2014, we successfully **delivered a baby whose mother was on a Left Ventricular Assist Device (LVAD)**.



NewYork-Presbyterian physician-scientists are engaged in medical and surgical innovation that has changed the way newborn care is delivered throughout the world.

# Meet Our Team

## Obstetrics



### **Mary E. D'Alton, MD**

*Chair, Obstetrics & Gynecology Maternal-Fetal Medicine*

NewYork-Presbyterian/Columbia University Medical Center

*Director of Services*

NewYork-Presbyterian Sloane Hospital for Women

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### **Lynn L. Simpson, BSc, MSc, MD, FACOG**

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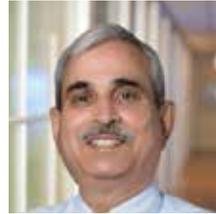
## Neonatal ICU/Pediatrics



### **Richard A. Polin, MD**

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*Garrett Isaac Neubauer Assistant Professor of Pediatrics*  
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### **Helen M. Towers, MD**

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